

REC'D 07 MAY 2003

WIPO

PCT

P1 1001063

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME;

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office

April 29, 2003

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: 60/371,652

FILING DATE: April 10, 2002

RELATED PCT APPLICATION NUMBER: PCT/US03/10231



By Authority of the  
COMMISSIONER OF PATENTS AND TRADEMARKS

*M. Tarver*

M. TARVER  
Certifying Officer

**PRIORITY  
DOCUMENT**  
SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

04/10/02

1C846 U.S. P.

04-12-02

A7PROV

Please type a plus sign (+) inside this box 

Approved for use through 10/31/2002 OMB 0651-0032  
 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
 Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

# **PROVISIONAL APPLICATION FOR PATENT COVER SHEET** This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

INVENTOR(S)					
Given Name (first and middle (if any))		Family Name or Surname		Residence (City and either State or Foreign Country)	
Frank J.		Viola		320 Greatquarter Road, Sandyhook, CT 06482	
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
ENDOSCOPIC APPLIER WITH HIGH TORQUE JAWS					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number		<input type="text"/>		<div style="border: 1px solid black; padding: 5px; text-align: center;">             Place Customer Number              Bar Code Label here           </div>	
OR Type Customer Number here					
<input checked="" type="checkbox"/> Firm or Individual Name		Paul R. Audet			
Address		United States Surgical, a Division of Tyco Healthcare Group LP			
Address		150 Glover Avenue			
City		Norwalk		State	Connecticut
Country		US		ZIP	06856
		Telephone	203-845-1480	Fax	203-845-4266
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages		20		<input type="checkbox"/> CD(s), Number	
<input checked="" type="checkbox"/> Drawing(s) Number of Sheets		5		<input type="checkbox"/> Other (specify)	
<input type="checkbox"/> Application Data Sheet, See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)	
<input type="checkbox"/> A check or money order is enclosed to cover the filing fees				26,439	
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number.		21-0550		\$160.00	
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are _____					

Respectfully submitted

SIGNATURE



Date 04 / 10 / 02

TYPED or PRINTED NAME Paul R. Audet

 REGISTRATION NO.  
 (if appropriate)  
 Docket Number:

26,439

2787PRO (203-3103)

TELEPHONE 203-845-1480

## **CERTIFICATION UNDER 37 C.F.R. § 1.10**

I hereby certify that this correspondence and the documents referred to as enclosed are being deposited with the United States Postal Service on date below in an envelope as "Express Mail Post Office to Addressee" Mail Label Number \_\_\_\_\_ addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Dated:

4/10/02

(Name)

Susan S. Rickard

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Frank J. Viola

Examiner: To Be Determined

Group Art Unit: To Be Determined

Serial No: To Be Determined

Filed: Concurrently Herewith

For: ENDOSCOPIC APPLIER WITH HIGH TORQUE JAWS

Asst. Commissioner For Patents  
PO Box 2327  
Arlington, VA 22202  
Att. Box: PATENT APPLICATION

CERTIFICATE OF EXPRESS MAILING

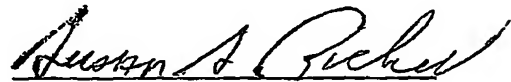
"Express Mail" Mailing Label No.: EJ767194917US

Date of Deposit: April 10, 2002

I hereby certify that the following:

- ☒ This Certificate of Express Mailing
- ☒ Application Transmittal Letter (1 pages + 2 copies)
- ☒ Application (20 pages including specification, and claims)
- ☒ 5 sheets of drawings (informal).
- ☒ Return Postcard

are being deposited with the United States Postal Services under 37 CFR Section 1/10 on the Date of Deposit indicated above in an envelope addressed to the Asst. Commissioner of Patents, Washington, D.C. 20231, Att. Box: PATENT APPLICATION.

  
Susan S. Rickard

U.S. Surgical, a division of  
TYCO HEALTHCARE GROUP LP  
150 Glover Avenue  
Norwalk, Connecticut 06856  
(203) 845-1172

RECEIVED  
APR 10 2002  
U.S. PATENT & TRADEMARK OFFICE

**ENDOSCOPIC APPLIER WITH HIGH TORQUE JAWS**

**BACKGROUND**

1. Technical Field

The present disclosure relates to an apparatus for applying surgical clips to body tissue during open, laparoscopic or endoscopic procedures and, more particularly, to a surgical clip applier having jaws configured and adapted to withstand torsional forces acting thereon.

2. Background of Related Art

In laparoscopic and endoscopic surgical procedures, a small incision is made in the patient's body to provide access for a cannula device. Once extended into the patient's body, the cannula provides an access port which allows insertion of various surgical instruments, through the cannula, for acting on organs, blood vessels, ducts or body tissue that can be far removed from the incision. In many instances, several small incisions must be made in the patient's body in order to provide access of several instruments into the patient's body. Undoubtably, the more incisions required, the greater the trauma inflicted on the patient's body.

In surgical procedures, it is often necessary or desirable for a surgeon to grasp and/or blunt dissect in conjunction with applying surgical clips to a target area. Often, this requires the surgeon to make two incisions, one for the blunt dissection instrument and one for the endoscopic applier. However, recently, in order to reduce the trauma inflicted on the patient's body, surgeons have begun to perform blunt dissections using the distal end of an endoscopic

fastener or clip applier in order to perform the blunt dissection itself. In so doing, the surgeon eliminates the need to make extra incisions or to repeatedly, alternately insert the clip applier and then the blunt dissector.

When performing a blunt dissection, the distal end of a dissection instrument is used to separate or divide tissue by dividing the interconnecting membrane through repeated twisting and/or separating actions. For example, if the distal end of a surgical fastener or clip applier instrument with jaws were to be used for blunt dissection, the distal end of the jaws would be pressed into the interconnecting membrane and the jaws would then be opened and/or twisted, which opening and/or twisting would separate the interconnecting membrane. The procedure might be repeated as often as needed in order to fully separate the adjacent corporal bodies.

It is an object of the present disclosure to provide an apparatus for applying surgical fasteners or clips to body tissue during open, laparoscopic or endoscopic procedures.

It is another object of the present disclosure to provide an apparatus for applying a surgical fastener or clip that is used to manipulate and/or blunt dissect tissue prior or subsequent to applying fasteners or clips.

Another object of the present disclosure is to provide an apparatus for applying surgical fasteners or clips which has increased resistance to the loading (e.g., torsional, twisting, bending, etc.) effects experienced during grasping, manipulating and blunt dissecting techniques.

Another object of the present disclosure is to provide an apparatus for applying surgical fasteners or clips having a jaw configuration which is inherently resistant to distortion due to manipulation during grasping and blunt dissecting techniques.

A further object of the present disclosure is to provide a surgical fastener or clip applier that is easier to load with a fastener or clip and which makes forming the same easier.

A further object of the present disclosure is to provide an apparatus having coplanar jaws for applying a surgical clip, which jaws maintain their coplanarity.

A further object of the invention is to provide a surgical fastener or clip applier that has increased resistance to torsional forces and properly loads, forms and applies surgical fasteners or clips after having performed a blunt dissection procedure.

These objects together with other objects of the disclosure, along with the various features of novelty which characterize the disclosure, are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

By way of example only, preferred embodiments of the disclosure will be described with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a prior art apparatus for applying surgical clips in laparoscopic or endoscopic procedures;

FIG. 2 is an enlarged perspective view of the jaw mechanism of FIG. 1;

FIG. 3 is an enlarged perspective view, with portions broken away, of a distal end portion of a jaw mechanism according to the present disclosure;

FIG. 4 is an enlarged perspective view, with portions broken away, of a distal end portion of a jaw mechanism according to an alternative embodiment of the present disclosure; and

FIG. 5 is a top plan view, with portions broken away, of the distal end portion of the jaw mechanism shown in FIG. 4.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now in detail to the figures, in which like reference numerals identify similar or identical elements, FIG. 1 illustrates a typical prior art surgical fastener or clip applying instrument, here shown as surgical clip applier 10. Clip applier 10 includes a handle portion 12 having a movable handle 14 and a stationary hand grip 16, which serves to operate a jaw mechanism 20 through the provision of an elongated body portion 18. For example only, the junction at which the body portion 18 is joined to the handle portion 12 includes a rotation collar 22 for varying the orientation of the jaw mechanism 20 at the surgical site. Typical surgical clip applying instruments are described in commonly assigned U.S. Patent No. 5,607,436 to Pratt et al. and U.S. Patent No. 5,084,057 to Green et al., the entire disclosures of which are incorporated herein by reference.

FIG. 2 shows a jaw mechanism in the form of an integral jaw blade, generally 50, which at a distal end has a pair of coplanar jaws 52 in an open position for reception of a surgical clip therein. The basic objective of the jaw blade 50 is to bias surgical clips (not shown), after the jaws themselves have been positioned around an artery or blood vessel, by closing the jaws together thereby bringing together portions of the legs of a "U" or other appropriately shaped clip in order to sufficiently close the artery or blood vessel. Jaw blade 50 preferably is fabricated in one piece and preferably of a material having sufficient resilience such that clamping of jaws 52 toward each other to close a clip therebetween will be followed by a return of the jaws to their original position upon release of the clamping forces. Such a material can be comprised of a suitable metal, thermoplastic or thermoset or a combination thereof. It is understood that jaw blade 50 can be comprised of legs or members that are not monolithically formed, and that the legs need not be joined together at their proximal ends.

In a clamping procedure, jaws 52 are closed by the clamping forces imposed for example by distal movement of a tubular or other suitable member over the jaws. However, since each jaw 52 is located at the distal end of the blade 50 and is essentially independent of the other jaw, in a blunt dissection procedure using partly or fully open or closed jaws, a torsional force (i.e., a twisting force) and/or a bending force applied to the distal end of one or both jaws 52 may cause jaws 52 to come out of co-planar alignment with one another.

Turning now to FIGS. 3 and 4, a jaw blade, in accordance with the present disclosure, having inter-leg engaging members for reducing the effects of vertical deflection force acting on each leg of the jaw blade is disclosed. As described in greater detail below, the vertical deflection forces acting on each leg, whether the jaws are in an open or closed position, tend to cause the legs of the jaw blade to create a torque or a twisting about the longitudinal axis of the jaw blade. This torque can result in the legs of the jaw blade coming out of alignment and/or coplanarity with one another.

FIG. 3 shows the distal end portion of a jaw blade, generally designated 100, in accordance with the present disclosure for use in connection with a surgical clip applying instrument, for example, clip applier 10. Jaw blade 100 includes a first leg and a second leg, 102A and 102B respectively, each having a corresponding intermediate neck portion 106A and 106B, and a corresponding jaw 104A and 104B formed at a distal end of the leg and configured and adapted for receiving a surgical clip (not shown) therebetween. Jaw blade 100 further includes inter-leg engaging members preferably comprised of a pair of arms 108A and 108B axially spaced from one another and preferably extending from and between the inner surfaces of each respective neck portion (i.e., the surfaces of each respective neck portion which are oriented toward and substantially face one another) of respective neck portions 106A and 106B of jaw



blade 100. Each arm 108A and 108B includes a tongue 110A and 110B extending from the main portion of the arm. Tongues 110A and 110B are configured and adapted to engage or be engageable with a corresponding recess 112A and 112B formed preferably in a top surface of each neck portion 106A and 106B, at least when the jaws are in an assembled, less than full open position. Preferably, at least a portion of each tongue closely overlies a portion of a recess at least when the assembled jaws are fully open.

Further, as seen in FIG. 3, by way of example only, the ends of tongues 110A and 110B at the distal ends of arms 108A, 108B preferably are generally U-shaped and sized to be received in and mate with corresponding U-shaped side walls of recesses 112A and 112B. While generally "U" shaped tongues and recesses are shown, it is envisioned that any configuration and/or shape of tongue and recess can be provided. For example, the tongue need not be horizontally disposed but can be a vertical beam that extends from one neck portion and which fits snugly into a vertical recess formed in a corresponding surface of an other neck portion. The tongues and/or arms need not be identical, and the same applies to the recesses.

In a blunt dissection technique performed with a clip applier 10 having a jaw blade 100 according to the present disclosure, with no surgical clip in place, i.e., when jaws 104A, 104B are open, when a vertical deflecting force is applied in a direction "A" on the first jaw 104A, which force "A" tends to cause jaw 104A to deflect vertically upward, thereby causing the pair of jaws 104A and 104B to twist or bend about one another in a counter-clockwise direction, the floor of recess 112A formed in neck 106A will engage or abut against the corresponding juxtaposed surface of tongue 110B projecting from the corresponding arm 108B extending from second neck 106B, thereby preventing first jaw 104A from twisting about second jaw 104B. Likewise, when a force is applied in a direction "B", opposite to the direction "A", on the first

50371655 04400000

jaw 104A, which force "B" tends to cause jaw 104A to deflect vertically downward, thereby causing the pair of jaws 104A and 104B to twist about one another in a clockwise direction, tongue 110A projecting from arm 108A extending from first neck 106A engages or abuts against recess 112B formed in neck 106B, thereby preventing first jaw 104A from twisting about second jaw 104B. It follows that, tongues 110A and 110B in cooperation with recesses 112B and 112A respectively will prevent vertical deflection forces acting directly on second jaw 104B from twisting second jaw 104B about first jaw 104A thereby preventing jaws 104A and 104B from becoming out of plane with one another. This can be especially advantageous when arms 102A and 102B are not joined at their proximal ends.

Jaw blade 100 according to the present disclosure preferably is fabricated of a material having sufficient resilience such that clamping of the pair of jaws 104A and 104B toward each other to close a clip therebetween will be followed by a return of the jaws 104A and 104B to their original position upon release of the clamping forces. However, unlike the prior art jaw blades, the jaw blade according to the present disclosure is less susceptible to the effects of torsional or bending forces acting thereon as a result of one or more inter-leg engaging members, here shown as a pair of arms 110A and 110B that extend preferably from corresponding neck portions 106A and 106B, respectively, and that interengage with opposite neck portions 106B and 106A, respectively, thereby reducing distortion.

FIGS. 4 and 5 show the distal end portion of an alternative jaw blade, generally designated 200, in accordance with the present disclosure for use in connection with the surgical clip applier 10. The distal end portion of jaw blade 200 includes a first leg and a second leg 202A and 202B each having a corresponding intermediate neck portion 206A, 206B, and a corresponding jaw 204A and 204B formed at a distal end thereof and configured and adapted for

receiving a surgical clip (not shown) therebetween. Neck portion 206A includes an arm 208 extending therefrom and oriented toward neck 206B, which arm 208 includes at its distal end an upper tongue and a lower tongue 210A and 210B, respectively, which together define a clevis 212 therebetween. Neck portion 206B includes upper and lower recesses 214A and 214B, respectively, formed along a top and a bottom surface thereof, which pair of recesses define a wall 216 therebetween. Wall 216 is configured and adapted to engage the walls that form clevis 212 of arm 208. In this manner, first jaw 204A is operatively coupled to second jaw 204B.

FIG. 5 is a top plan view of the distal end portion of jaw blade 200 after it is mounted in the distal end of a clip applier (not shown) while it is in an un-crimped or un-squeezed state (i.e., having jaws 204A and 204B in an open position, spaced apart from one another). As seen in FIG. 5, while jaws 204A, 204B are in the un-crimped state, arm 208 extends from neck portion 206A a distance sufficient for a portion of its upper tongue 210A to lap, here, to closely overlies, wall 216 and for a portion of its lower tongue 210B to lap, here, underlie, wall 216 at 220. In this manner, first jaw 204A is aligned or co-planar with second jaw 204B at all times from the spaced apart state through to the crimped or closed state. Moreover, by being already lapped, here, closely overlapped and underlapped at 220, while in the open or spaced apart state, jaws 204A and 204B do not have to be at all manipulated, e.g., moved to a more closed position prior to use in order for wall 216 to be aligned with and received in clevis 212.

Preferably the lower (or upper) surface of a tongue closely overlies (or underlies), and more preferably is slidably engaged with the upper (or lower) surface of the underlying (or overlying) recess, preferably when the applier is assembled and the jaws are in a fully open position. "Closely overlies (or underlies)" here means that the minimum gap of the tongue above (or below) the upper (or lower) surface of the recess is the normal manufacturing tolerance range

for the device. This can be from about 0.0005 inch to about 0.040 inch or more, the greater the gap, of course, the less effective the arm may be in preventing twisting of one jaw or leg relative to the other. The maximum gap in accordance with this invention is that gap at which, during blunt dissection, the tongue and recess surfaces will engage when a torque is applied to either jaw or leg.

In performing a blunt dissection technique with a clip applier 10 having a jaw blade 200 in accordance with the present disclosure, with assembled jaws 204A, 204B in a fully open position with no surgical clip in place, when a force is applied in a direction "A" on the first jaw 204A, which force "A" tends to cause the pair of jaws 204A and 204B to twist or bend about one another, the lower tongue 210B extending from the distal the end of arm 208 will abut against the top wall of lower recess 214B (bottom surface of wall 216) formed in neck portion 206B, thereby preventing the first jaw 204A from twisting or bending about the second jaw 204B. Likewise, when a force is applied in a direction "B", opposite to the direction "A", on the first jaw 204A, which force "B" tends to cause the pair of jaws 204A and 204B to twist about one another, upper tongue 210A extending from the distal end of arm 208 will abut against the floor of upper recess 214A (top surface of wall 216) formed in neck portion 206B, thereby preventing the first jaw 204A from twisting about the second jaw 204B. Thus, tongues 210A and 210B in cooperation with the recesses 214A and 214B will prevent forces acting directly on the second jaw 204B from twisting or bending the second jaw 204B about the first jaw 204A, thereby preventing the jaws 204A, 204B from coming out of plane with one another.

It is contemplated that jaw configurations in accordance with the present disclosure can be fabricated from any suitable biologically inert material including, but not limited to,

engineering plastics, stainless steel, titanium, shape memory alloys and spring steel as well as composites.

The high torque jaws according to the present disclosure can be incorporated in the assembly of new fastener or clip appliers or in the alternative can be a simple low cost modification to existing fastener or clip appliers wherein only the distal end of the jaws, legs of the blades, or the jaw blades, need to be replaced without the need to modify any other portion of the surgical instrument. Stated differently, the high torque jaws according to the present disclosure can be retrofitted into existing fastener or clip appliers.

Each of the above disclosed inter-leg engaging members preferably are configured to give the jaw blade a low profile. However, it is envisioned that various other inter-leg engaging members can be provided which tend to reduce the vertical deflection forces acting on each individual leg from causing the pair of legs or jaws from coming out of alignment with each other. For example, it is envisioned that the inter-leg engaging members can include a first arm having a proximal end fixedly secured to an upper surface of a neck or other portion of a first leg of a jaw blade, and a distal end overlying the upper surface of a neck or other portion of a second leg of the jaw blade, and a second arm having a proximal end fixedly secured to a lower surface of the neck or other portion of the first leg of the jaw blade and a distal end underlying the lower surface of the neck portion of the second leg of the jaw blade. In this manner, as one leg is deflected either vertically upward or downward, the first and the second arm cause the second leg to deflect vertically as well.

By way of a further example, it is envisioned that the inter-leg engaging members can include a first arm having a proximal end fixedly secured to an upper surface of a neck or other portion of a first leg of a jaw blade and a distal end overlying an upper surface of a neck or other

portion of a second leg of the jaw blade; and a second arm having a distal end fixedly secured to the upper face of a neck or other portion of the second leg of the jaw blade and a proximal end overlying the upper surface of the neck or other portion of the first leg of the jaw blade. In this manner, as one leg is deflected either vertically upward or downward, the first and the second arm cause the second leg to deflect vertically as well.

As a further example, each leg can have an inter-leg engaging member, e.g., an arm, extending therefrom and the arms can closely overlie and/or interengage each other, to achieve the objectives of the invention.

The arm(s) can be any suitable width or diameter and can extend from any portion along the length of the legs, neck or jaw portion of the blade so long as the arm(s) do not interfere with the feeding of the clips into and through the jaws. Generally speaking, the arm(s) are most effective when they are located as close to the distal tip of the jaws as possible, and are decreasingly effective the further they are removed from the distal tip of the jaws. Also generally speaking, to allow for visibility of a clip while seated in the jaw, the arm(s) desirably are located beyond the proximal end, e.g., the backspan, of the seated clip. Thus, for a seated 0.3 inch long clip, the arm(s) would desirably be positioned at least from about 0.3 inches to about 2.0 inches from the distal tip of the jaws.

Although the present disclosure is explained in reference to a clip applier, it is understood that the disclosure applies to apparatus for applying surgical fasteners or clips.

It is understood that various modifications may be made to the embodiments disclosed herein. For example, it is envisioned that the jaws according to the present disclosure can be thickened in the vertical direction, anywhere along the length of the jaws, in order to provide increased rigidity and resistance to vertical deflections. Therefore, the above description should

not be construed as limiting, but merely as an exemplification of preferred embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto.

2007-1552-04-1002

## WHAT IS CLAIMED

1. A jaw blade for use in a surgical clip applier, comprising:  
a first leg and a second leg, each leg having a jaw integrally connected thereto, and  
an inter-leg engaging member that extends from one of said first and second legs and is  
engageable with the other of said first and second legs.

2. The jaw blade of claim 1, wherein when said inter-leg engaging member is  
engaged with the other of said first and second legs, a vertical displacement in a first direction of  
one of said first and second legs causes a first corresponding displacement in said first direction  
of said other of said first and second legs, and such that a vertical displacement in a second  
direction, opposite said first direction, of said one of said first and second legs causes a second  
corresponding displacement in said second direction of said other of said first and second legs.

3. The jaw blade of claim 1, wherein the jaw blade includes two inter-leg engaging  
members, a first one that extends from said first leg and is engageable with said second leg, and a  
second one that extends from said second leg and is engageable with said first leg.

4. The jaw blade of claim 3, wherein when said respective first and second inter-leg  
engaging members are engaged with said respective second and first legs, a vertical displacement  
in a first direction of one of said first and second legs causes a first corresponding displacement  
in said first direction of said other of said first and second legs, and such that a vertical  
displacement in a second direction, opposite said first direction, of said one of said first and



second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

5. The jaw blade of claim 4, wherein first inter-leg engaging member comprises a first arm, and said second inter-leg engaging member comprises a second arm.

6. The jaw blade of claim 1, wherein said first leg includes a first inner surface oriented toward said second leg and a recess formed in a lower portion of said first inner surface, said second leg includes a second inner surface oriented toward said first leg and a recess formed in an upper portion of said second inner surface, said first arm extends from said first inner surface of said first leg and includes a tongue extending distally therefrom, said tongue of said first arm being configured to be received in and be engaged with said recess in said second upper surface of said second leg; and said second arm extends from said second inner surface of said second leg and includes a tongue extending distally therefrom, said tongue extending from said second arm being configured to be received in and be engaged with said recess in said lower surface of said first leg.

7. The jaw blade of claim 1, wherein there are two inter-leg engaging members, one comprising a first arm that extends from said first leg and closely overlies and is engageable with said second leg, and the other comprising a second arm that extends from said first leg and closely underlies and is engageable with said second leg.

8. The jaw blade of claim 1, wherein said first leg includes a first arm that extends from said first leg toward said second leg, said first arm including a pair of transversely spaced apart tongues extending distally therefrom, said second leg including an upper and lower surface, an upper recess in said upper surface and a lower recess in said lower surface, and said pair of spaced apart tongues of said first arm are configured to be received in and be engageable with said upper and lower recesses formed respectively in said upper and lower surfaces of said second leg.

9. The jaw member of claim 1, wherein when said jaw member is assembled in a surgical clip applier and said jaws of said jaw member are in an open position, a portion of said inter-leg engaging member that extends from one of said first and second legs, closely overlies a portion of said other of said legs.

10. The jaw member of claim 3, wherein when said jaw member is assembled in a surgical clip applier and said jaws of said jaw member are in an open position, a portion of said inter-leg engaging member that extends from one of said first and second legs, slidingly engages a portion of said other of said legs.

11. The jaw member of claim 6, wherein a portion of said tongue of said first arm closely overlies said recess in said second upper surface of said second leg, and a portion of said tongue of said second arm closely underlies said recess in said first lower surface of said first leg.

12. The jaw member of claim 8, wherein said pair of spaced apart tongues of said first arm closely overlie and underlie said respective upper and lower recesses of said second leg.

13. The jaw blade of claim 1, wherein each of said first and second legs includes a neck adjacent said jaw of said respective first and second legs, and said inter-leg engaging member extends from one of said necks.

14. The jaw blade of claim 13, wherein there are two inter-leg engaging members, one that extends from said neck of said first leg, and another that extends from said neck of said second leg.

15. A jaw blade for use in a surgical clip applier, comprising:  
a first leg and a second leg, each leg having a jaw integrally connected thereto, and  
an inter-leg engaging member extending between and slidingly engaged with the other of said first and second legs.

16. The jaw blade of claim 15, wherein when said inter-leg engaging member is slidingly engaged with the other of said first and second legs, such that a vertical displacement in a first direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

17. The jaw blade of claim 15, wherein said first leg includes a first neck portion and said second leg includes a second neck portion, said first and second neck portions adjoining said first and second jaws, and said engaging member includes:

a first arm that extends from said first neck portion and slidingly engages said second neck portion, and

a second arm, spaced from said first arm, that extends from said second neck portion and slidingly engages said first neck portion.

18. The jaw blade according to claim 17, wherein said first neck portion includes an inner surface oriented toward said second neck portion and a recess formed in a lower portion of said inner surface, and said second neck portion includes an inner surface oriented toward said first neck portion and a recess formed in an upper portion thereof; said first arm extends from said inner surface of said first neck portion and includes a tongue extending distally therefrom, said tongue extending from said first neck portion being configured and adapted to be received in said recess formed in said upper surface of said second neck portion; and said second arm extends from said inner surface of said second neck portion and includes a tongue extending distally therefrom, said tongue extending from said second neck portion being configured and adapted to be received in said recess formed in said upper surface of said first neck portion, at least one of said first and second tongues being slidingly engaged with its respective recess.

19. The jaw blade according to claim 18, wherein said inter-leg engaging member comprises:

a first arm configured and adapted to extend from said first neck portion and overlie and slidingly engage said second neck portion, and

a second arm configured and adapted to extend from said first neck portion and underlie and slidingly engage said second neck portion.

20. The jaw blade according to claim 15, wherein said first neck portion includes an arm extending from said first neck portion substantially toward said second neck portion, said arm including a pair of transversely spaced apart tongues extending distally therefrom; wherein said second neck portion includes an upper and lower surface and an upper and a lower recess formed in said upper and lower surfaces thereof respectively, and wherein said pair of spaced apart tongues of said arm slidingly engage said upper and lower recesses formed in said upper and a lower surfaces of said second neck portion.

21. In an apparatus for applying surgical fasteners or clips including a handle portion, the apparatus including a body portion extending from the handle portion, a jaw mechanism extending from the body portion at an end opposite the handle portion and having a first leg and a second leg, each leg having a jaw mechanism integrally connected thereto, the jaw mechanisms being movable between an open position for receiving a fastener or clip and a closed position for forming a fastener or clip in response to a movement of the handle portion, and, a fastener or clip supply disposed within the body portion, the improvement in the jaw mechanism comprising:

an inter-leg engaging member extending between and being adapted to effect an engagement between said first and second legs, such that a vertical displacement in a first

direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs.

22. The apparatus of claim 21, wherein said inter-leg engaging member is adapted to effect engagement when said jaws are in an open position.

23. The apparatus of claim 21, wherein said inter-leg engaging member is adapted to effect engagement when said jaws are in a closed position.

24. A method for applying surgical clips and performing blunt dissection of tissue, comprising the steps of:

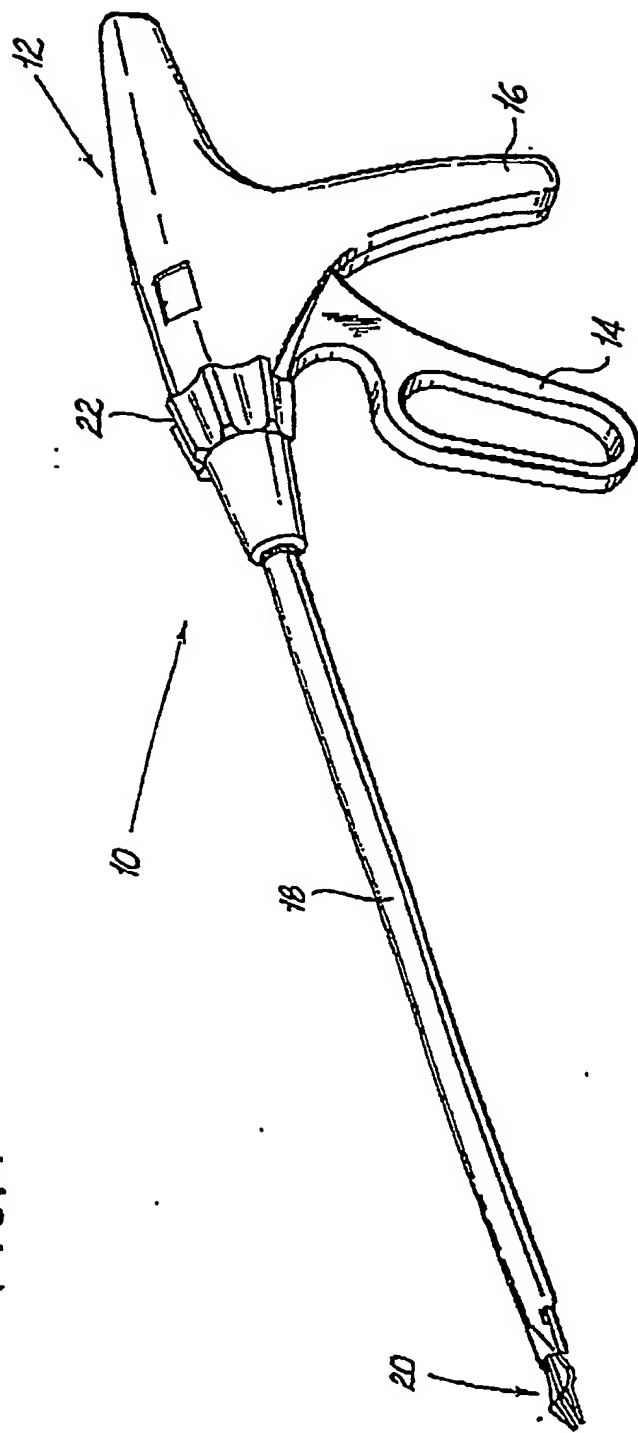
providing a surgical clip applier, which surgical clip applier includes a jaw blade having a first leg and a second leg, each leg having a jaw integrally connected thereto, and

an engaging member extending between and effecting an engagement between said first and second legs, such that a vertical displacement in a first direction of one of said first and second legs causes a first corresponding displacement in said first direction of said other of said first and second legs, and such that a vertical displacement in a second direction, opposite said first direction, of said one of said first and second legs causes a second corresponding displacement in said second direction of said other of said first and second legs,

performing a blunt dissection technique utilizing the jaws of said clip applier, and  
applying a surgical clip to a tissue or vascular target area utilizing said clip applier.

60374652-044002

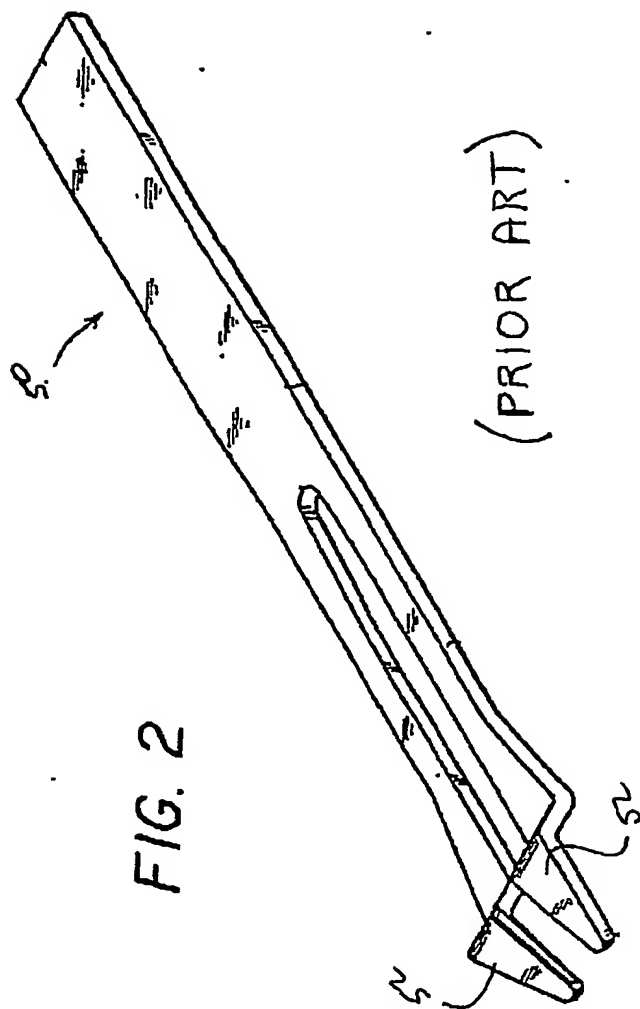
FIG. 1



(Prior Art)



200740: 2501200



100

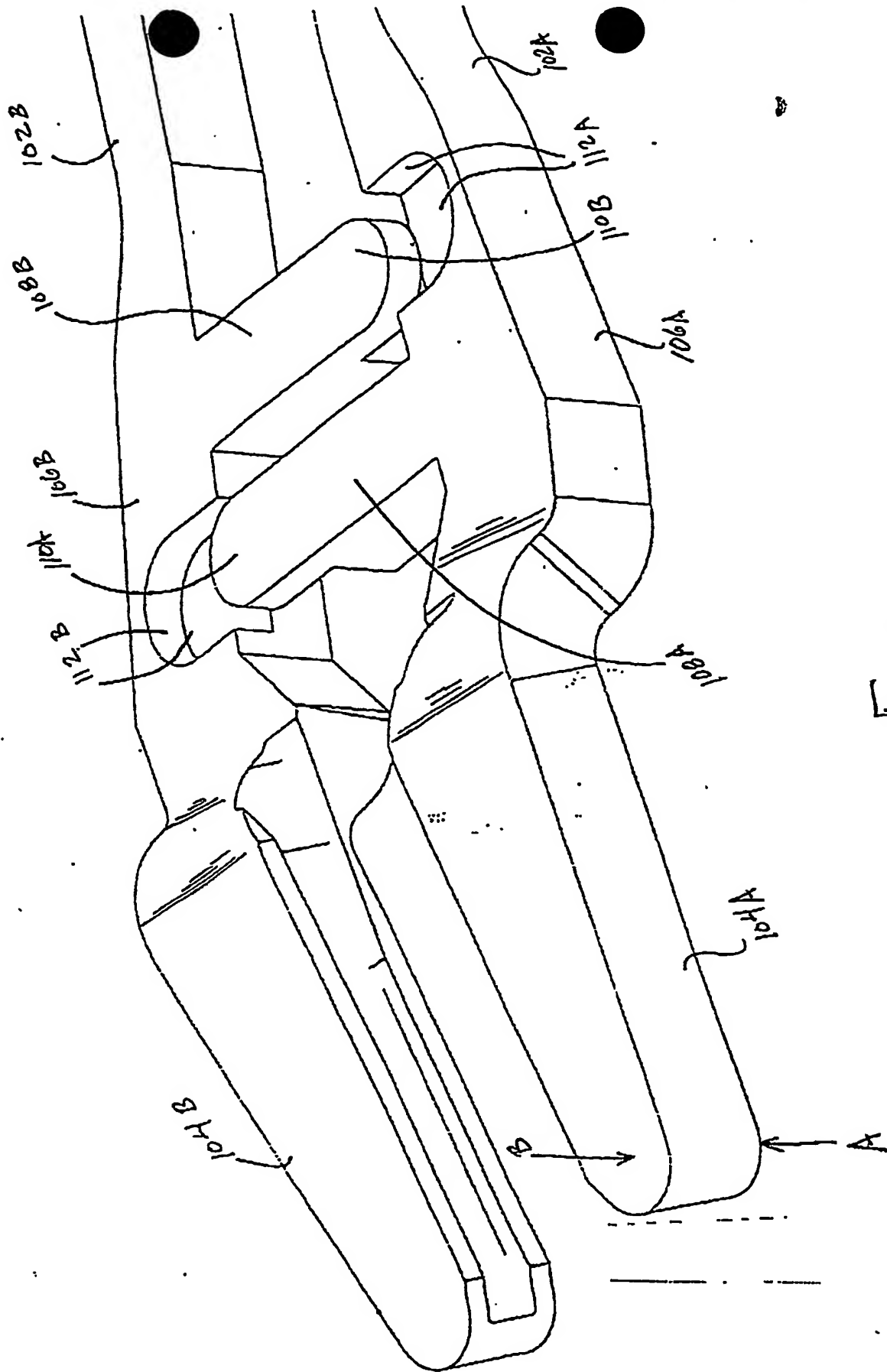
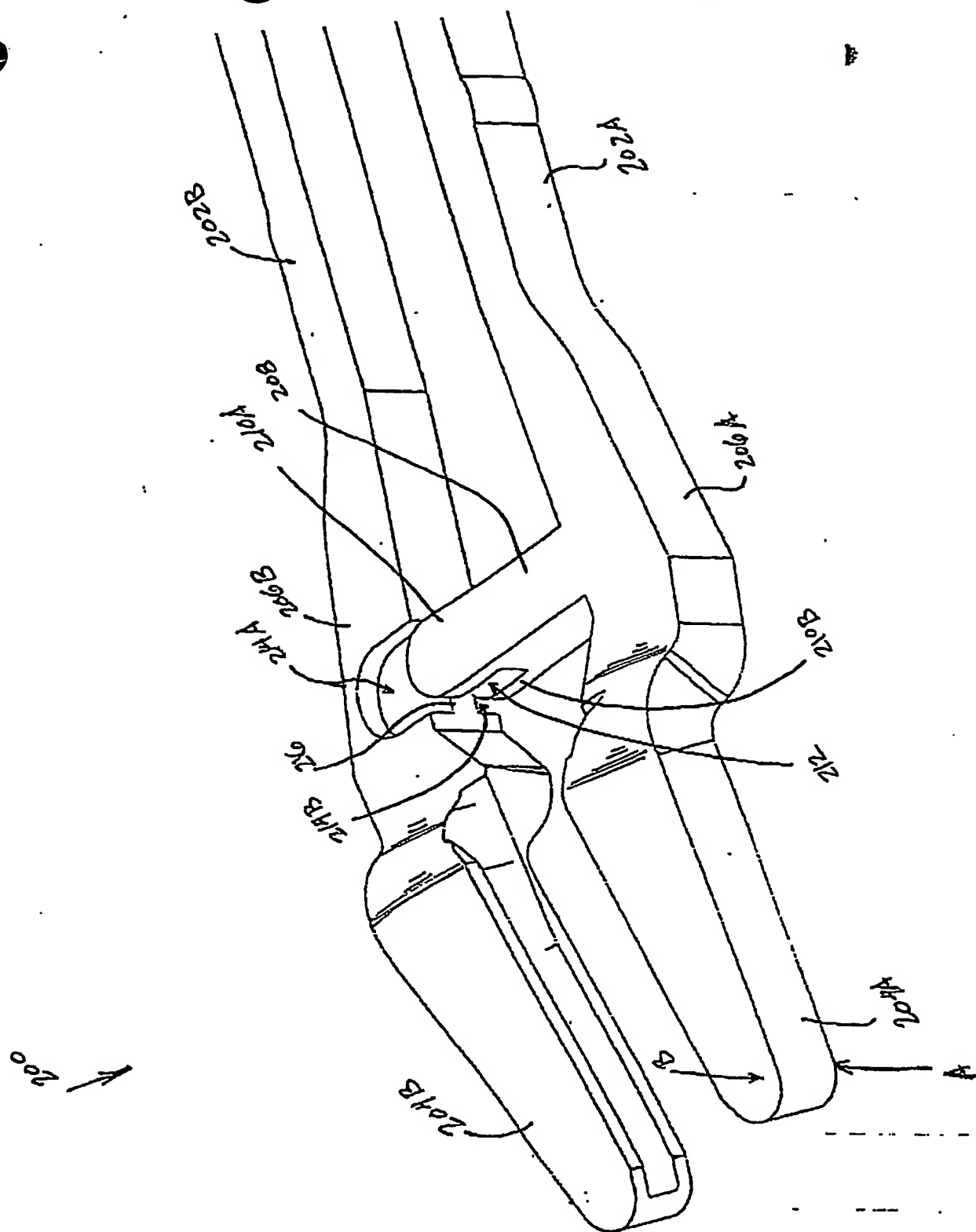


Fig. 3

य  
Ling



51  
 52  
 53  
 54  
 55  
 56  
 57  
 58  
 59  
 60  
 61  
 62  
 63  
 64  
 65  
 66  
 67  
 68  
 69  
 70  
 71  
 72  
 73  
 74  
 75  
 76  
 77  
 78  
 79  
 80  
 81  
 82  
 83  
 84  
 85  
 86  
 87  
 88  
 89  
 90  
 91  
 92  
 93  
 94  
 95  
 96  
 97  
 98  
 99  
 100  
 101  
 102  
 103  
 104  
 105  
 106  
 107  
 108  
 109  
 110  
 111  
 112  
 113  
 114  
 115  
 116  
 117  
 118  
 119  
 120  
 121  
 122  
 123  
 124  
 125  
 126  
 127  
 128  
 129  
 130  
 131  
 132  
 133  
 134  
 135  
 136  
 137  
 138  
 139  
 140  
 141  
 142  
 143  
 144  
 145  
 146  
 147  
 148  
 149  
 150  
 151  
 152  
 153  
 154  
 155  
 156  
 157  
 158  
 159  
 160  
 161  
 162  
 163  
 164  
 165  
 166  
 167  
 168  
 169  
 170  
 171  
 172  
 173  
 174  
 175  
 176  
 177  
 178  
 179  
 180  
 181  
 182  
 183  
 184  
 185  
 186  
 187  
 188  
 189  
 190  
 191  
 192  
 193  
 194  
 195  
 196  
 197  
 198  
 199  
 200  
 201  
 202  
 203  
 204  
 205  
 206  
 207  
 208  
 209  
 210  
 211  
 212  
 213  
 214  
 215  
 216  
 217  
 218  
 219  
 220  
 221  
 222  
 223  
 224  
 225  
 226  
 227  
 228  
 229  
 230  
 231  
 232  
 233  
 234  
 235  
 236  
 237  
 238  
 239  
 240  
 241  
 242  
 243  
 244  
 245  
 246  
 247  
 248  
 249  
 250  
 251  
 252  
 253  
 254  
 255  
 256  
 257  
 258  
 259  
 260  
 261  
 262  
 263  
 264  
 265  
 266  
 267  
 268  
 269  
 270  
 271  
 272  
 273  
 274  
 275  
 276  
 277  
 278  
 279  
 280  
 281  
 282  
 283  
 284  
 285  
 286  
 287  
 288  
 289  
 290  
 291  
 292  
 293  
 294  
 295  
 296  
 297  
 298  
 299  
 300  
 301  
 302  
 303  
 304  
 305  
 306  
 307  
 308  
 309  
 310  
 311  
 312  
 313  
 314  
 315  
 316  
 317  
 318  
 319  
 320  
 321  
 322  
 323  
 324  
 325  
 326  
 327  
 328  
 329  
 330  
 331  
 332  
 333  
 334  
 335  
 336  
 337  
 338  
 339  
 340  
 341  
 342  
 343  
 344  
 345  
 346  
 347  
 348  
 349  
 350  
 351  
 352  
 353  
 354  
 355  
 356  
 357  
 358  
 359  
 360  
 361  
 362  
 363  
 364  
 365  
 366  
 367  
 368  
 369  
 370  
 371  
 372  
 373  
 374  
 375  
 376  
 377  
 378  
 379  
 380  
 381  
 382  
 383  
 384  
 385  
 386  
 387  
 388  
 389  
 390  
 391  
 392  
 393  
 394  
 395  
 396  
 397  
 398  
 399  
 400  
 401  
 402  
 403  
 404  
 405  
 406  
 407  
 408  
 409  
 410  
 411  
 412  
 413  
 414  
 415  
 416  
 417  
 418  
 419  
 420  
 421  
 422  
 423  
 424  
 425  
 426  
 427  
 428  
 429  
 430  
 431  
 432  
 433  
 434  
 435  
 436  
 437  
 438  
 439  
 440  
 441  
 442  
 443  
 444  
 445  
 446  
 447  
 448  
 449  
 450  
 451  
 452  
 453  
 454  
 455  
 456  
 457  
 458  
 459  
 460  
 461  
 462  
 463  
 464  
 465  
 466  
 467  
 468  
 469  
 470  
 471  
 472  
 473  
 474  
 475  
 476  
 477  
 478  
 479  
 480  
 481  
 482  
 483  
 484  
 485  
 486  
 487  
 488  
 489  
 490  
 491  
 492  
 493  
 494  
 495  
 496  
 497  
 498  
 499  
 500  
 501  
 502  
 503  
 504  
 505  
 506  
 507  
 508  
 509  
 510  
 511  
 512  
 513  
 514  
 515  
 516  
 517  
 518  
 519  
 520  
 521  
 522  
 523  
 524  
 525  
 526  
 527  
 528  
 529  
 530  
 531  
 532  
 533  
 534  
 535  
 536  
 537  
 538  
 539  
 540  
 541  
 542  
 543  
 544  
 545  
 546  
 547  
 548  
 549  
 550  
 551  
 552  
 553  
 554  
 555  
 556  
 557  
 558  
 559  
 560  
 561  
 562  
 563  
 564  
 565  
 566  
 567  
 568

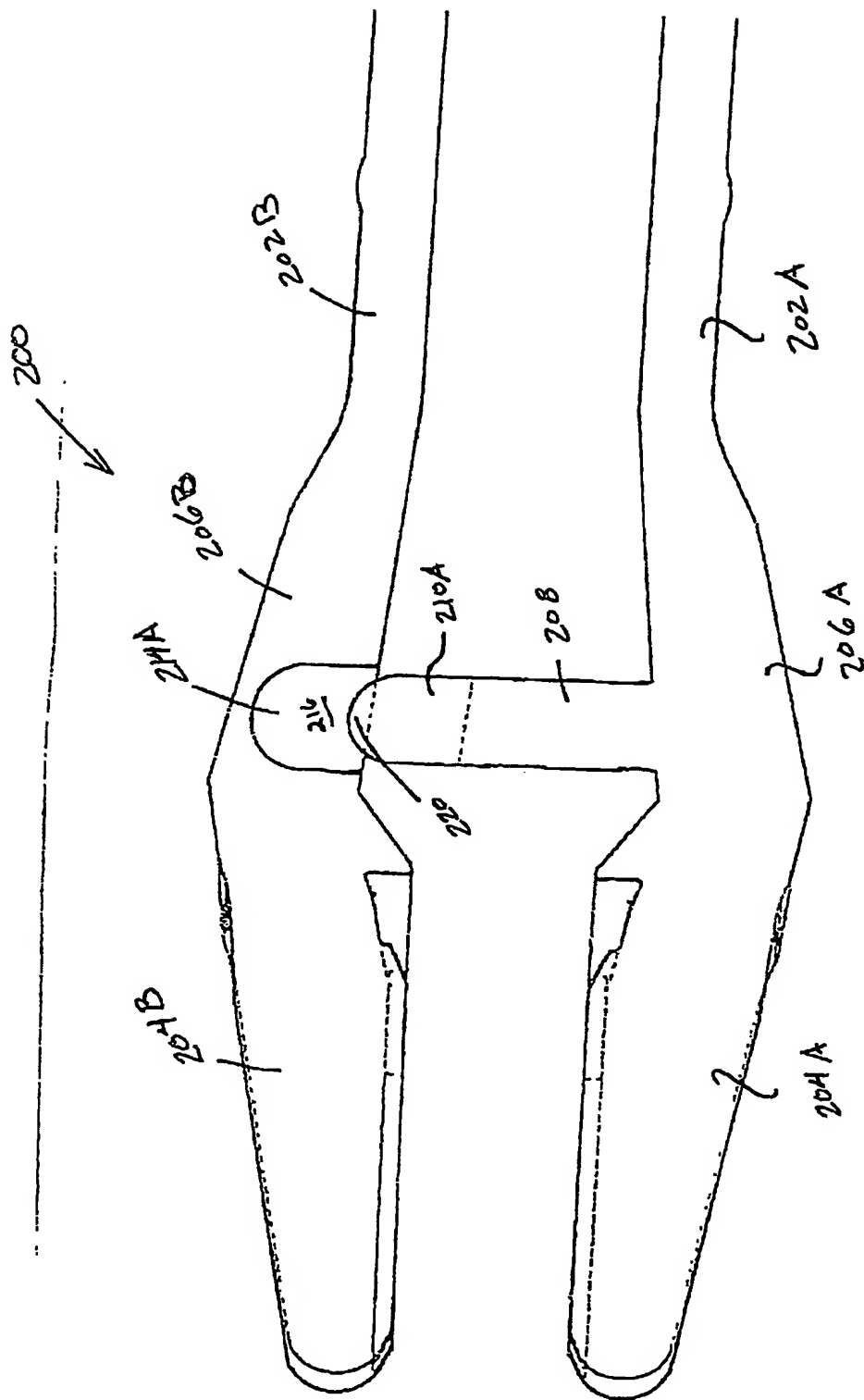


Fig. 5